FEDERAL AVIATION ADMINISTRATION

September 21, 2009
Prepared by the:
Asset Management and NAS Supply Support Team
Technical Operations Service, ATO-W
Air Traffic Organization

FAA Asset Identification
Process and Procedure Guide

Preface

The FAA has a significant number of assets used in the performance of its mission and these assets must be properly identified, inventoried, controlled, and managed throughout their life cycle for maintenance, supply support, and as required by Federal government mandates.

FAA has developed an asset bar coding and data collection capability to enhance productivity, remove the need for redundant tasks, and eliminate administrative errors within FAA property management and ATO maintenance activities. This guide provides the mechanism for identifying or tagging FAA personal property assets and ensuring those assets are included within the FAA's asset management systems.

Vaughn Turner
Director of Technical Operations Support
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General

1. What is the purpose of this guide?

This guide was written to provide an easy to use "how to" tool to assist you in asset identification including barcoding, tagging, or identifying FAA personal property assets using FAA asset identification standards. It ensures FAA assets are properly identified and managed from the time the asset is initially acquired until it reaches the end of its life cycle and is disposed of.

2. To whom does this guide apply?

It covers FAA headquarters, regions, centers (also referred to as "regions"), and field organizations, and applies to all FAA employees who manage FAA asset acquisitions.

3. What is the governing authority for this guide?

The Federal Property and Administrative Services Act of 1949, as amended (Act of 30 June 1949, 63 Stat. 372), the Chief Financial Officers (CFO) Act of 1990, and FAA Order 4600.27, dated 11/16/07.

4. What does this guide cover?

This guide covers all FAA accountable personal property and operating inventory used in the National Airspace System (NAS) and other FAA personal property assets used in the performance of its mission that is owned or controlled by the FAA. These assets are located within all FAA facilities as well as contractor facilities. In addition:

   a) Future acquisitions of NAS systems require vendors to identify and tag all assets to the lowest replaceable/repairable units (LRU), during assembly or at the time deemed most appropriate in order to maintain the warranty or integrity of the assets.

   b) Future acquisitions of non-NAS assets or systems, consisting of FAA accountable property, as defined in FAA Order 4600.27 are tagged prior to delivery or acceptance by the FAA. Non-accountable assets may be tagged and recorded in AITS at the discretion of the property custodian.

5. To whom do "we", "you", and their variants refer?

Use of pronouns "we", "you", and their variants refer to the agency.

6. What information does this guide contain?

The following two documents are included in this guide:

   a) Asset Identification Specification. This document describes the attributes of the FAA asset identification specification as developed by the Asset Management and NAS

Supply Support Team, ATO-W, AML and GS1 US (formerly Uniform Code Council, Inc.).

b) Asset Identification Contract Data Requirements List (CDRL) and Data Item Description (DID). This document provides instructions for incorporating CDRLs and DIDs into all FAA asset acquisitions.

7. How do we request a deviation from these requirements and who can approve it?

Deviations must be submitted in writing to the FAA Service Management Group, Asset Management and NAS Supply Support Team, ATO-W, at 800 Independence Avenue, SW, Washington, DC 20591.

8. What are my responsibilities?

Effective asset management depends on your involvement as well as that of organizations that acquire, develop, own, operate, or replace the agency's personal property assets.

a) The Vice President of Technical Operations. ATO-W is the focal point and has overall responsibility for the FAA personal property management program. As such the ATO-W sponsors FAA asset identification initiatives.

b) The Vice President of Acquisition and Business Services (ATO-A) has overall responsibility to make sure all applicable contracts and procurements contain applicable clauses from the Acquisition Management System (AMS), requiring newly acquired assets to be properly identified and tagged in accordance with the Asset Identification Specification.

c) All LOBs and SOs are responsible to make sure proper FAA assets are properly identified as they move through their life cycle.

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Asset Identification Specification

Revision History

Author	Date	Version
AFZ-500	11/21/2002	v1.0
UCC®	4/15/2003	v1.1
UCC®	5/29/2003	v2.0
AFZ-500	6/10/2003	v2.1
AFZ-500	6/24/2003	v2.2
UCC®	7/25/2003	v2.3
AFZ-500	11/18/2003	v2.4
AMNSS	12/13/04	v2.5
AMNSS	5/27/06	v2.5.1
AMNSST	6/16/06	V2.5.2
AMNSST	9/21/2009	V2.5.5
AMNSST	7/10/2009	V2.5.4
AMNSST	9/21/2009	V2.5.5

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1   Introduction

1.1   Purpose

This document describes the attributes of the Federal Aviation Administration (FAA) Asset Identification Specification as developed by the Asset Management and NAS Supply Support Team (AM&NSST) and GS1 US (formerly Uniform Code Council, Inc.). This specification is in conformance with the GS1 Global Individual Asset Identifier (GIAI) standard. This specification shall be used FAA-wide for personal property asset identification.

This document also establishes two barcode specifications that define the format, standard, location and definition of the barcode label for identifying FAA accountable personal property and operating inventory used in the National Airspace System (NAS) in the performance of its mission that is owned or controlled by the FAA. The first specification is for a linear, or 1-D, barcode label, which encodes the asset's GIAI; the second specification is for a data matrix, or 2-D, barcode label, which encodes the GIAI as well as the CAGE code, part number, and serial number of the asset. The data matrix specification was finalized in July, 2009 after being accepted by both GS1 US and the Department of Defense (DoD).

1.2   References

Table 1 below provides a complete list of all documents and publications referenced in this specification.

Document	Reference
ISO/IEC 15416 Information technology	Automatic identification and data capture techniques – Barcode print quality test specification – Linear symbols (See paragraph 12)
ISO/IEC 15417 Information technology	Automatic identification and data capture techniques – Barcode symbology specification – Code 128 (See paragraph 21)
ISO/IEC 15424:2000 Information technology	Automatic identification and data capture techniques – Data Carrier Identifiers (including Symbology Identifiers)
Guidelines for Department of Defense Unique Identification (UID) Markings using the GS1 System	http://barcodes.gs1us.org/dnn_bcec/Documents/tabid/136/DMXModule/731/Command/Core_Download/Default.aspx?EntryId=51
International Organization for Standardization (ISO)	http:///www.iso.ch
GS1 US (formerly Uniform Code Council, Inc.)	www.gs1us.org
GS1 Global (formerly EAN International)	www.gs1.org
Department of Defense (DoD) MIL STD-130N	http://www.id-integration.com/docs/specs/MIL-STD-130N.pdf
ISO/IEC 15434 Information	Syntax for high-capacity data capture (ADC) media

technology	
ISO/IEC 15415 Information technology	Automatic identification and data capture techniques—Bar code print quality test specification—Two dimensional symbols
ISO/IEC 16022 Information technology	Automatic identification and data capture techniques—Data Matrix bar code symbology specification
SAE AS 9132	Society of Automotive Engineers (SAE) aerospace industry marking standard
Department of Defense Cataloging Handbook H2 – Federal Supply Classification Groups and Classes	www.dlis.dla.mil

Table 1: References

2 Specification

This section details the specifications for FAA asset barcode labels, including symbology, printing requirements, data requirements, materials, placement and replacent of labels, and appearance.

2.1 Barcode Standard

	Section 2.1 applies to both linear (1-D) and Data Matrix (2-D) barcode labels.

2.1.1 Unique identification

FAA assets are identified using one of two standards. The 1-D, or linear, standard consists of a barcode label that encodes a globally unique number, the GIAI, designed to link the physical asset to attributes about the asset in the FAA database.he 2-D, or data matrix, standard consists of a data matrix bacode which encodes the GIAI as well as the CAGE code, part number, and serial number.

The applicable standard is determined according to the following criteria:

Asset ID Standard	Criteria for Selecting Asset ID Standard
Data Matrix	Equipment that affects the operation of the National Airspace System (NAS). These assets are also referred to as Exchange and Repair (E&R) assets as they can be exchanged and repaired through the FAA Logistics Center (FAALC). E&R assets are defined as equipment classified under the following Federal Supply Groups (FSGs): 58 – Communication, Detection, and Coherent Radiation Equipment 59 – Electrical and Electronic Equipment Components 61 – Electric Wire, and Power and Distribution Equipment 66 – Instruments and Laboratory Equipment For more information on FSGs, please refer to the DoD Cataloging Handbook H2.
Linear barcode	All other assets

Table 2: Criteria for determining asset ID standard

It is intended that the asset label and the information in the asset management systems provide all required identification of the asset over its entire serviceable life cycle.

2.1.2 Asset labeling

The FAA barcode label will be affixed to the asset. It will provide both a human readable asset reference number in text format and, when space permits, machine-readable barcode

information. In certain circumstances the barcode label may be directly marked, etched or embedded on the item. The FAA barcode label becomes the "license plate" against which all the attributes of the asset may be recorded and with which the same information may be quickly and easily referenced and/or retrieved.

2.1.3   Environmental considerations

Asset labels must be able to withstand many environments (indoors, outdoors and the extreme heat and cold therein, exposure to solvents, oils, alcohol, etc.). Outdoor environments include locations in the U.S. as well as international locations where FAA assets exist. Labels must also be able to withstand periodic cleaning with water and detergent, and other chemicals used during maintenance, repair, and overhaul.

2.1.4   FAA Order applicability

This specification applicable to asset identification as defined in Order 4600.XX.

2.2   Symbology and Printing Requirements for 1-D (Linear) Barcodes

▐▌▐▐▌▐▌	**Section 2.2 applies only to linear (1-D) barcode labels.**

2.2.1   Barcode symbology

The barcode symbology is GS1-128 which is based on the ISO Standard for barcode symbology specification – Code 128 (ISO/IEC 15417). An example of information available in above-referenced ISO document includes:

- Symbology characteristics
- Symbol structure
- Character assignments
    o Symbol character structure
    o Data character encodation
    o Code Sets
    o Special characters
    o Symbol check character
- Dimensional requirements
    o Minimum width of a module (X)
    o Quiet zone
- Reference decode algorithm
- Symbol quality
    o General
    o Decodability
    o Quiet zones
- User-defined application parameters
    o Symbology and data characteristics
    o Test specification
- Transmitted data.

2.2.2   Barcode printing

For printing, the bars in the barcode and the human readable portion of the asset identification labels should be printed black on a white background. The printed symbol shall be ISO/IEC Grade 3.0 or better at time of printing. All labels should be printed with a protective surface laminate that results in an ISO/IEC symbol grade of 2.0 or better at the time of lamination. These two parameters are designed to ensure an ISO/IEC symbol grade of 1.5 in the label's final form.

Labels shall conform to the ISO Standard for barcode print quality test specification (ISO/IEC15416). Listed below are examples of information available in the above-referenced ISO document:

- Symbols and abbreviated terms
  - Abbreviations
  - Symbols
- Measurement methodology
  - General requirements
  - Reference reflectivity measurements
    - Measurement wavelength(s)
    - Measuring aperture
    - Optical geometry
    - Inspection band
    - Number of scans
  - Scan reflectance profile
  - Scan reflectance profile assessment parameters
    - Element determination
    - Edge determination
    - Decode
    - Symbol contrast (SC)
    - Minimum reflectance (Rmin)
    - Edge contrast (EC)
    - Modulation (MOD)
    - Defects
    - Decodability
    - Quiet zone check
  - Symbol grading
    - Scan reflectance profile grading
      - Decode
      - Reflectance parameter grading
      - Decodability
    - Expression of symbol grade
  - Substrate characteristics

2.2.3 Print contrast

The print contrast is to be measured per ISO/IEC 15416. Follow the GS1 standard, which is 1.5/10/670 – symbol grade/measuring aperture/wave length; this references the ISO/IEC 15416.

2.2.4 Field overlap

The barcode and the human readable data are separate fields. Each field should not protrude on any other, thereby maintaining the ability to distinguish between them.

2.3 Data Requirements for 1-D (Linear) Barcodes

▐▐▎▌▐▐▌	**Section 2.3 applies only to linear (1-D) barcode labels.**

This section provides details on the data elements that make up the linear barcode identification standard.

2.3.1 Mandatory Data

The following data elements must be included in the asset label:

1. Application Identifier
2. GS1 Company Prefix
3. Asset Reference

2.3.2 Symbol Syntax

The grammar, structure, and order of the barcode symbol elements is as follows:

\<ST\>\<FNC1\>\<AI\>\<GS1 Company Prefix\>\< Asset Reference\>\<Symbol Check Character\>\<Stop\>

The symbol elements are defined in Table 5 below:

Element	Definition
\<ST\>	Symbol start character
\<FNC1\>	An element built into the barcode providing unique data integrity. It tells the scanning application that the data that follows will be in the GS1 format and that Application Identifiers will be used to identify the data. It is called: 'function code one'.
\<AI\>:	Application Identifier. The Application Identifier (AI) for assets is 8004. It tells the scanning application that the data that follows is an asset number. This prevents common errors, like a serial number being mistaken for an asset number.
\<GS1 Company Prefix\>	Unique company identification assigned by GS1 US to members. It ensures the asset number is unique worldwide.
\<Asset Reference\>	Unique variable length field. FAA assets are to be identified with a 9 character numeric field assigned by the holder of the

	GS1 company prefix. A unique reference is assigned to each instantiation of the asset.
<Symbol Check Character>	A symbol character included within a GS1-128 Symbol, the value of which is used by the barcode reader for the purpose of performing a mathematical check to ensure the accuracy of the scanned data. It is not shown in Human Readable Interpretation. It is not input to the barcode printer and is not transmitted by the barcode reader. It is built into the symbology.
<Stop>	Symbol stop character.

Table 3: Barcode symbol elements

2.3.3   Human Readable Text

Human readable text is to appear *above* the symbol with the exception of the small barcode identified in Table 5, Example C. The human readable text is not encoded; it is represented as follows:

<div align="center">Property of DOT/FAA</div>

Human readable text is to appear *below* the symbol. The human readable text is represented as follows:

For FAA assets:

<div align="center">(8004) 0602970 XXXXXXXXX</div>

where XXXXXXXXX is the unique Asset Reference Number assigned by FAA.

For Contractor Barcoded assets:

<div align="center">(8004) NNNNNNN XXXXXXXXX</div>

where NNNNNNN is the Contractor's GS1 Company Prefix, and XXXXXXXXX is the unique Asset Reference Number assigned by the Contractor.

NOTE: Parentheses and Spaces are not encoded in the label, and are for human readability only.

2.4   Asset Label Specifications for 1-D (Linear) Barcodes

▌║▐║║▌	**Section 2.4 applies only to linear (1-D) barcode labels.**

The label specifications are provided in Table 4 below. Label samples are also shown in Table 5 below, and are to scale.

Label	X-Dimension (inches)	Quiet Zone (inches)	Label Size (inches)	Bar Height (inches)	Human Readable Minimum Character Height (inches)
A – Large Barcode	0.0100	.100	2.00 x 0.500 with corner radius	0.25	0.063 (6 pt. True Type Arial)
B – Medium Barcode	0.0066	.066	1.38 x 0.375 with corner radius	0.15	0.063 (6 pt. True Type Arial)
C – Small Barcode	0.0066	.066	1.38 x 0.25 with corner radius	0.15	0.063 (6 pt. True Type Arial)

Table 4: Label specifications

Description	Sample Labels
A - Large Asset Barcode	Property of DOT/FAA (8004) 0602970 123456789
B - Medium Asset Barcode	Property of DOT/FAA (8004) 0602970 123456789
C – Small Asset Barcode	(8004) 0602970 123456789

Table 5: Sample Labels

The human-readable information on the labels comes from the following sources:

Label Information	Source
(8004)	GS1 Global Individual Application Identifier – this signifies that the barcode is used for the identification of an asset.
0602970	GS1 Company Prefix assigned to the FAA
123456789	Asset reference assigned by FAA to asset (sample value)

Table 6: Sources of human readable information on 1-D labels

NOTE: DOT/FAA text, Parentheses and Spaces are not encoded in the label, and are for human readability only.

2.5 Symbology and Printing Requirements for 2-D (Data Matrix) Barcodes

	Section 2.5 applies only to Data Matrix (2-D) barcode labels.

2.5.1 Data matrix symbology

The Data Matrix standard is based on ISO/IEC 15424:2000. For AMS mandated Item Unique Identification (IUID) marking, the minimum mark is a Data Matrix ECC 200 symbol using

ISO/IEC 15434 syntax and the semantics of ISO/IEC 15418. The two-dimensional symbol shall be the Data Matrix ECC 200 in accordance with ISO/IEC 16022.

2.5.2   Data matrix size

Unless otherwise specified, the module size shall be no smaller than 0.0075 inch (0.19 mm) and no larger than 0.025 inch (0.635 mm). Square symbol sizes shall not exceed one inch (25.4 mm). The larger dimension of rectangular Data Matrix symbols, as permitted by ISO/IEC 16022, shall not exceed one inch. Deviations from the stated module sizes and maximum overall symbol size shall be specified by contract if required. The data elements shall be encoded in the Data Matrix symbol using the syntax of ISO/IEC 15434. For examples, please see section 2.7 below.

2.5.3   Data matrix symbol quality

The following provide acceptance criteria for all marking procedures that can be used at the Supplier's choice:

2.5.3.1 ISO/IEC 15415

The symbol shall have a minimum quality grade of 3.0/05/650 measured with an aperture size of 0.005 inch (0.127 mm) with a light source wavelength of 650 nm ± 20 nm. As an exception, the ISO/IEC 15415 parameters Modulation (MOD), Symbol Contrast (SC), or both, may measure as low as 2.0, providing the overall ISO/IEC 15415 grade would be 3.0 if the MOD and SC grades are 3.0 or higher. (This allows for lower contrast substrates, high density images, printing, over-laminates and other such limiting factors to the parameters MOD, SC, or both on otherwise well produced images.) Quality (symbol validation and verification) reports shall clearly show that the MOD, SC, or both, are the only parameters measured as low as 2.0, and clearly show that the overall grade would be at least 3.0 if MOD and SC were at least 3.0. Quality reports shall also document the synthetic aperture size used. The methodology for measuring the print quality shall be as specified in ISO/IEC 15415, where the overall grade is based on a single scan (not five scans).

2.5.3.2 AIM DPM-1-2006

The symbol shall have a minimum quality grade of DPM2.0/7.5-25/650/(45Q|30Q|90|30T|30S|D) where:

1. Minimum quality grade = 2.0
2. X dimension range of the application = 7.5-25 mils
3. Inspection wavelength = 650 nanometers ± 20 nanometers.
4. Lighting conditions = Medium Angle Four Direction (45Q) or Low Angle Four Direction (30Q) or Diffuse Perpendicular (90) or Low Angle Two Direction (30T) or Low Angle One Direction (30S) or Diffuse Off-axis (D).

2.5.3.3 SAE AS9132

The symbol shall fulfill the visual inspection criteria of "Pass" as defined in AS9132.

2.5.4   Calibration of verification equipment

Due to the absence of a nationally traceable standard to calibrate verification equipment, calibration processes and materials for reflectance criteria provided by the verifier manufacturer are acceptable.

2.5.5   Alternative quality measuring methodologies

 If the preceding quality measuring methodologies specified are non-responsive, quality acceptance levels shall be identified within the individual contract or order.

2.5.6   Field overlap

The barcode and the human readable data are separate fields. Each field should not protrude on any other, thereby maintaining the ability to distinguish between them.

2.6   Data Requirements for 2-D (Data Matrix) Barcodes

	Section 2.6 applies only to Data Matrix (2-D) barcode labels.

This section provides details on the data elements that make up the 2-D barcode identification standard.

2.6.1   Symbol Syntax

The grammar, structure, and order of the barcode symbol elements is defined in Table 7 below:

Data Element	Data Content	Length
Message Header	]>>	3
Record separator (RS)	Chr(30)	1
Format Header	05	2
Group separator (GS)	Chr(29)	1
Application Identifier	8004 The Application Identifier (AI) for assets is 8004. It tells the scanning application that the data that follows is an asset number. This prevents common errors, like a serial number being mistaken for an asset number.	4
Company Code Prefix	06029070 for FAA; GS1-assigned prefix for contractors Unique company identification assigned by GS1 US to members. It ensures the asset number is unique worldwide.	7
Asset Reference Number	Unique variable length field. FAA assets are to be identified with a 9 character numeric field assigned by the holder of the GS1 company prefix. A unique reference is assigned to each instantiation of the asset.	31
Record separator (RS)	Chr(30)	1
Format header	12	2
Group separator (GS)	Chr(29)	1
CAGE code prefix	CAG[space] if Mike Monroney Aeronautical Center (MMAC) created the mark MFR[space] if the manufacturer reated the mark	4
CAGE code	The Commercial and Government Entity (CAGE) code is a unique identifier assigned to suppliers as well as to government agencies and various organizations.	5
Group separator (GS)	Chr(29)	1
Original part number prefix	PNR[space]	4
Original part number	Part number assigned by the asset manufacturer.	32
Group separator (GS)	Chr(29)	1
Serial sequence number prefix	SEQ[space]	4
Serial sequence number	Serial number assigned by the manufacturer.	20
Record separator (GS)	Chr(30)	1
End of Transmission (EOT)	Chr(4)	1

Table 7: 2-D barcode syntax

Legend:

Green rows	Message header/trailer
Yellow rows	GS1 Asset Identification (AI) syntax.
Blue rows	ATA Text Element Identifier syntax. TEIs are specified as 4 charcter identifiers consisting of 3 alphabetic characters followed by a space.

RED TEXT	Literal data

Example:

[)>**RS**05**GS**80040602970xxxxx **RS**12**GS** CAG 12345**GS**PNR ABC123**GS**SEQ 7890**RSEOT**

where
RS = record separator, Chr(30)
GS = group separator, Chr(29)
xxxxx = asset reference number, not to exceed 31 bytes
EOT = end of transmission, Chr(4)

2.6.2   Human readable text

Human readable text is to appear *above* the symbol with the exception of the small barcode identified in 2.7 below. The human readable text is not encoded; it is represented as follows:

Property of DOT/FAA

Human readable text is to appear *to the left of* the symbol. The human readable text is represented as follows:

CAG (or MFR) CCCCC
SEQ SSSSSSS
PNR PPPPPPPPPPPPPPP

Where CCCCC is the CAGE code, SSSSSSS is the serial number, and PPPPPPPPPPPPPPP is the part number.

Note: The CAGE code will be preceded by CAG if the mark was created by the MMAC, or MFR if the mark was created by the manufacturer.

2.6.3   Legibility of human readable text

Legibility shall be as required for human readability. For human-readable information, the recommended minimum character height for human readable text is the equivalent of :

Character Height (Centimeters)	Character Height (Inches)	Character Height (Points)
0.2 cm	0.08 in	5.76 pts

Table 8: Recommended human-readable text heights

Letters shall be capitals without serifs (sans-serif) such as Arial, Futura, Gothic, Trebuchet MS, or other sans-serif font. Numerals shall be Arabic except when Roman numerals are used for type designation per applicable Government or industry specifications and standards. Generating characters by automated processes (e.g., dot peen, laser, interactive graphics systems, or stencils) shall be the preferred method.

2.7 Asset Label Specifications for 2-D (Data Matrix) Barcodes

	Section 2.7 applies only to Data Matrix (2-D) barcode labels.

The label specifications are provided in Table 9 below. Label samples are also shown, and are to scale**.**

Size	Example
4.2 x 2.5 Data Matrix and human readable CAG, SEQ, PNR and UII	
2.5 x 1.5 Data Matrix and human readable CAG, SEQ, PNR and UII	
1.1 x 0.54 Data Matrix and human readable CAG, SEQ and PNR	
Data Matrix only Data Matrix only with no human-readable text	

Table 9: Sample 2-D Barcode Labels

The human-readable information on the labels comes from the following sources:

Label Information	Source
MFR or CAG	CAGE code Text Element Identifier (TEI). A TEI of MFR represents that the manufacturer created mark. A TEI of CAG represents the Mike Monroney Aeronautical Center (MMAC) created the mark.

1U2R7	CAGE code of the asset (sample value)
SEQ	Serial number TEI
MH80312	Serial number of the asset (sample value)
PNR	Original Part Number TEI
F100200300400BP	Original part number of the asset (sample value)

Table 10: Sources of human readable information on 2-D labels

Items shall be individually marked as follows:

1. Data Matrix labels shall be printed with white mark and lettering on a black background.
2. Preferred marking includes Data Matrix with human-readable information.
3. Where space is limited, the linear human-readable information may be abbreviated.
4. To accommodate severe space limitations, human-readable information may be omitted from the item.

2.8   Material Specifications

Section 2.8 applies to both linear (1-D) and Data Matrix (2-D) barcode labels.

2.8.1   Resistance

The printed barcode image must be resistant to oils and solvents commonly used in the repair of printed circuit boards, such as water, alcohol, trichlorethane and hydrocarbon based solvents. Labels may be exposed to mechanical scrubbing using these solvents.

2.8.2   Specular reflection (substrate, laminate & imaging media)

Specific attention must be paid to the combination of label substrate (e.g., paper, metal, plastic, glass, ceramic, etc.) laminate (such as lacquer, clear tape, plastic over-wrap, etc.) and imaging media (e.g., ink, thermal transfer resin, photographic emulsion, etching, etc.) such that specular reflection is minimized.

2.8.3   Composition

The substrate for the asset label may be comprised of a variety of materials such as, but not limited to, bare and painted metals (i.e., steel and aluminum), various plastics, printed circuit boards, glass and wood.

2.8.4   Application temperature

Labels will be applied at temperatures between 50 and 100 degrees Fahrenheit. Once applied the label must retain adhesive properties over an exposure range of –40F to +200F.

2.8.5   Service environment

During its service life the label may be exposed to direct sunlight, rain, snow, ice, and to various solvents, degreasers, varnishes, oils, detergents, paints, mineral oil, solder flux and environmental temperatures ranging from –40F to 200F. Asset labels must remain affixed to the asset for the entire duration of the asset's lifetime. Asset labels should be produced so that, when

scanned, they will reflect a minimum symbol grade of ANSI 2.0 (See paragraph 5 for ongoing maintenance.).

2.9 Label Placement

▐█▌▌█ ▦	**Section 2.9 applies to both linear (1-D) and Data Matrix (2-D) barcode labels.**

2.9.1 Label accessibility

Asset identification labels should be located on the asset in a position that is easily accessible and can be read by a barcode scanner while the asset is in normal use. For example, if the rear of an asset is not normally easily accessible while in use, the asset label needs to be located on a side that is easily accessible (e.g., the front of the asset). It is desirable that labels be located close to or adjacent to the manufacturer's identification markings (serial, model, etc) if that location is also easily accessible for scanning.

When items cannot be physically marked (in the case that there is no space for a Data Matrix alone) or tagged due to a lack of marking space or because marking or tagging would have a harmful effect, the detailed marking requirements specified in this section shall be:

1. applied to a supplemental container that may or may not provide item protection, becomes a part of the individual item, and is provisioned and managed as a component of that item, or
2. applied to the unit pack in addition to, or in combination with, the identification marking information specified.

2.9.2 Number of labels

Only one FAA asset barcode label is to be affixed to an asset. In the case of replaceable or configurable modules, an asset label should be affixed to each of the lowest replaceable units within the assembly.

2.9.3 Application surfaces

Labels are intended to be applied to flat and curved rigid surfaces, which have been degreased and cleaned with solvent. Labels are not intended to be applied to Teflon, delrin, and their related chemical family. Labels should not be placed over manufacturer labels or any silk-screened text designation on the item. Labels should not be placed over any indicators such as diodes (LED's) nor placed in a fashion that would detract from the utility of usability for which the item was designed or intended to function.

2.9.4 Rough surfaces

It is recommended that labels be located on clean, smooth, flat surfaces where possible, and on surfaces that provide direct visual access for a scanner and its operator. Labels should not be applied to rough surfaces, since these surfaces reduce adhesive performance.

2.9.5 Curved surfaces

Labels applied to curved or cylindrical surfaces should be applied along the axis of the cylinder to make the barcode visible and able to be scanned. If it is necessary to apply along the radial axis, the curve radius must not be less than 1.5 inches.

For Data Matrix symbols applied to a curved surface, the overall symbol size shall not exceed more than 32% of the radius (16% of the diameter or 5% of the circumference) associated with the curvature of the surface.

2.9.6 Irregular surfaces

Labels are not intended for irregular or bumpy surfaces, nor should they be applied to spherical surfaces or surfaces composed of compound curves.

2.9.7 Administrative assets

On administrative assets such as furniture and equipment, labels should not be located on decorative surfaces or to any surface subject to routine wear and abrasion.

2.10 Replacement of Labels

Section 2.10 applies to both linear (1-D) and Data Matrix (2-D) barcode labels.

It is recognized that some asset labels may be exposed to environments so harsh as to render them unreadable after a period of time. For that reason, those personnel tasked with the inventorying assets, per FAA Order 4600.XX, are to ensure that asset labels are successfully scanned, and in the event of an unsuccessful scan the label is to be replaced following the FAA-approved procedure.

2.11 Unreadable Labels

Section 2.11 applies to both linear (1-D) and Data Matrix (2-D) barcode labels.

When a linear or Data Matrix symbol mark is unacceptable (unreadable, in error, etc.) and cannot be removed or otherwise repaired, replaced or re-worked without deleterious effect to the marked item, it shall be crossed out. Linear barcodes are to be crossed out as shown in Figure 1 below using two diagonal lines crossing each other through the center of the barcode symbol, and also crossing all of the bars making up the symbol:

Property of DOT/FAA

(8004) 0602970 123456789

Figure 1: Crossing out a linear barcode

Data Matrix barcodes are to be crossed out as shown in Figure 2 below using two diagonal lines crossing each other through the center of the Data Matrix symbol and two other lines (one

vertical the other horizontal) through the two interrupted frame lines (finder pattern) of the Data Matrix symbol. The marking method used shall be determined by the current design authority.
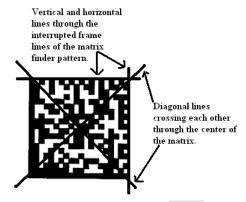
Figure 2: Crossing out a Data Matrix barcode

Placement of a new label shall follow the FAA-approved procedure as specified in the FAA Personal Property Management Process & Procedure Guide, or the applicable FAALC documentation.

3 Government and Contractor responsibilities

▌▌▌▌ ▦	**Section 3 applies to both linear (1-D) and Data Matrix (2-D) barcode labels.**

This section outlines the responsibilities of the Government (FAA) and contractors in the application of this specification to FAA assets.

3.1 Government asset identification

The Government (FAA) is responsible for providing asset identification for all FAA assets as defined in FAA Order 4600.XX. The FAA is required to provide asset identification for all assets (i.e., assets in the field). Labels produced by the FAA for its assets (or produced by a third party specifically for the FAA's assets) are to conform to the specifications detailed in Section 2 above.

3.2 Contractor asset identification

Contractors are required to provide asset identification for all assets that are delivered. The contractor will also provide an electronic Asset Identification Report per Contract Data Requirements List and Data Item Description (CDRL/DID), which includes the number on the label applied to the asset against which all the attributes of the asset may be recorded in, or extracted from, the FAA's Asset Tracking and Management System.

3.3 Contractor label specifications

Labels applied by contractors will follow the specifications detailed in Section 2 above.

3.4 Contractor GS1 Company Prefix

Contractors are also responsible for using the contractor's GS1 Company Prefix (plus the unique asset reference number maintained by the contractor), to meet the labeling performance requirements as specified in this document.

Appendix 1. Definitions

The following definitions apply to the terms used in this appendix.

Term	Definition
ANSI	The American National Standards Institute designates standards submitted by their accredited Standards Development Organizations. The American National Standards Institute designation is awarded after the opportunity for public review and comment, and a certification by the Standards Development Organizations that due process was followed in the development of the standard. GS1 US is an accredited standards development organization.
Application Identifier	The field of two or more characters, at the beginning of a string of data, which uniquely defines its format and meaning. For example, the Application Identifier for assets is 8004; it tells the scanning application that the data that follows is an asset number. This prevents common errors, like a serial number being scanned and mistaken for an asset number.
Asset	In general terms, an asset refers to a useful and valuable item that is owned or leased and is being used or is available for use in performance of FAA's mission.
Asset reference number	A number assigned by the enterprise to an item providing for the differentiation of that item from any other item. The entity responsible for labeling assets is responsible and accountable for not duplicating the asset reference number.
HRI	Human Readable Interpretation.
ISO	Worldwide federation of national standards bodies promoting the development of standardization and whose work results in the publication of international standards.
Life Cycle	There are two categories of life cycle: a. Data. The stages through which data pass, typically characterized as creation or collection, processing, dissemination, use, storage, and disposition. b. Information System. The phases through which information systems pass, typically characterized as initiation, development, operation, termination, and decommissioning.
Ongoing reference	For the purpose of this application guideline the terms and definitions given in Section 8, Glossary of Terms, of the *General GS1 Specifications* shall apply. The *General GS1 Specifications* is available at the GS1 US website at www.gs1us.org.
Quiet Zone	A clear space on a label, having no machine-readable marks, which precedes the Start Character of a barcode symbol and follows the Stop Character. Formerly referred to as "Clear Area" or "Light Margin."
GS1	GS1 (formerly EAN International), based in Brussels, Belgium, is an

	organization of GS1 Member Organizations that co-manages the GS1 System and Global Standards Management Process.
GS1 Company Prefix	The number assigned to a company by GS1 US. The inclusion of the GS1 Company Prefix ensures uniqueness throughout the world.
GS1 US	GS1 US (formerly Uniform Code Council, Inc.) is a not-for-profit organization dedicated to the development and implementation of standards-based, global supply chain solutions.
X- Dimension	The specified width of the narrow element in a barcode symbol; the narrowest nominal width unit of measure in a barcode symbol.

FEDERAL AVIATION ADMINISTRATION

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Prepared by the:
Asset Management and NAS Supply Support Team
Technical Operations Service, ATO-W
Air Traffic Organization

Asset Identification Contract Data Requirements List and Data Item Description (CDRL/DID)

Revision History

Author	Date	Version
AFZ-500	12/1/2002	v1.0
AFZ-500	10/1/03	v1.1
AFZ-500	11/18/03	v1.2
AFZ-500	3/16/04	v1.2.1
AMNSS	12/13/04	v1.2.2
AMNSS	1/28/05	v1.2.3
AHW	5/9/06	v1.2.4
AMNSST	5/27/06	V 1.2.5
AMNSST	6/16/06	V 1.2.6
AMNSST	5/1/09	V 1.2.7
AMNSST	7/10/09	V1.2.8
AMNSST	9/21/09	V1.2.9

Table of Contents

1 Introduction

1.1 Purpose

This document contains instructions for incorporating the Asset Identification Contract Data Requirements List and Data Item Description (CDRL/DID) for Linear Barcodes into all Federal Aviation Administration (FAA) personal property asset acquisition contracts.

1.2 Background

1.2.1 Barcode Specification

The FAA has adopted a barcode label specification, called FAA Asset Identification Specification, based on GS1 US (formerly Uniform Code Council, Inc.) standards. GS1 US is an international standards based organization that establishes asset identification standards for retail products such as the Uniform Product Code (U.P.C.) as well as other identification standards. The FAA has adopted the GS1 standard for Global Individual Asset Identifier (GIAI). The GS1 Global Individual Asset Identifier (GIAI) is the unique identifier and the pointer to the business critical information necessary to identify and track individual assets. The GIAI has become a pointer to an ever-expanding library of information stored in electronic databases. This GS1 system solution was designed to enable companies and agencies to eliminate duplication of asset numbers, provide tracing and tracking capabilities, facilitate maintenance, and provide asset configuration management and control.

The barcode specification provides for two types of asset identification labels:

- **1-D (or linear) barcode labels,** which encode the GIAI, and
- **2-D (or Data Matrix) barcode labels,** which encode the GIAI as well as manufacturer's CAGE code, part number and serial number.

The requirements in this CDRL-DID apply regardless of which barcode type is used. For an overview of the criteria to determine when each type of label is used, please refer to the Asset Identification Specification, section 2.1.1.

1.2.2 Electronic Asset Data

The FAA identifies delivery of a system to its installation point and initial testing, as the system inception. It is the goal of the FAA to capture all personal property asset movement and service activity from the system inception until system retirement. This CDRL/DID represents the initial characterization, serialization, and capture of asset and system detail. All accountable personal property assets (and, optionally, non-accountable assets), facility equipment, and project materiel assets are recorded in the Automated Inventory Tracking System (AITS) which is the FAA personal property management system of record. The information generated by the contractor is to be delivered to the FAA in electronic format to populate the AITS data fields for a delivered system.

1.2.3 Fixed File Format

The seed data may be delivered to the FAA via electronic media in the fixed file format, as described in Section 10 of the DID (see section 2.3).

2 Instructions

This section provides instructions for contract officers and acquisitions staff to communicate FAA's asset identification requirements to potential contractors.

To incorporate the Asset Identification CDRL and DID into a solicitation or contract relating to the acquisition of assets under the FAA Asset Identification Specification, do the following:

1. Include the SOW requirements (see sections 2.1 and 2.2), for asset identification in the Logistics section of your solicitation or contract and change the paragraph number from "X.0" to fit your numbering scheme.

2. Assign the CDRL a number by changing Block 1 of the CDRL from "A0xx" to fit your CDRL numbering (see section 2.2).

3. Include the SOW paragraph number for asset identification from above in Block 5 of the CDRL (see section 2.2).

4. Include the Asset Identification Specification documentation (in the previous section of this document) as Government Furnished Information (GFI) in the appropriate section of the solicitation.

2.1 Statement of Work

2.1.1 Asset Identification Report

2.1.1.1 Barcode Symbology Standard
The Contractor shall use the appropriate barcode symbology standard, as described in the Asset Identification Specification document, to identify contract assets at the Lowest Replaceable Unit (LRU) level. For each LRU barcoded asset, the contractor shall provide the following types of information:

- Barcode / Pin number
- Item Description
- Manufacturer's part number
- Manufacturers' serial number
- Manufacturer's CAGE Code
- Year Manufactured
- Cost

2.1.1.2 System-Level Data
The Contractor shall also provide system-level data such as:

- Major system components or enclosures
- Component / enclosure descriptive data
- System configuration
- Any other associated data

2.1.1.3 Examples of Equipment Types

LRU's may consist of circuit boards, modules, cable assemblies, motors, power supplies, etc. Ancillary equipment may consist of personal computer data terminals, displays, test rigs, etc. System components or enclosures may consist of cabinets, mounting assemblies, waveguides, etc.

2.1.1.4 Asset Management Systems

The Contractor is to use an FAA asset management systems or equivalent COTS package to manage the contract asset detail data for each category of asset from point of acquisition to production and delivery.

2.1.1.5 Barcoded Asset Listing

The Contractor will provide a report that contains a listing of all assets that have been identified with a barcode label. The report shall include all of the data elements considered for barcoding as specified in Block 10 of the DID (see Section 2.3).

2.1.1.6 Asset Identification Report

The Contractor will also provide an Asset Identification Report in accordance with the DID (DI-ATO-W-2003-005), Asset Identification Specification documentation, and the CDRL.

2.2 CDRL Items: A0xx Asset Identification Report

Contract Data Requirements List (CDRL)

1 A0xx	2 Asset Identification Report 3 Asset Identification Report			6 AMNSS ATO-W		10 ONE/R	12 (See Block 16)	14 ATO-W 1/1 LTO
4 DI-ATO-W-2003-005	5 SOW X.X	7 LT	8 A	9	11		13 ASREQ (See Block 16)	

16 REMARKS
 	
   Block 12:   Submit prior to acceptance of the FAA assets. Submit to FAA at 800 Independence Ave. SW, Washington, DC 20591
                  Attn: Asset Management and NAS Supply Support Team (ATO-W) / System Engineer
 	
   Block 13:   Subsequent submissions shall be as required inclusive of Government comments.
 	
   Block 14:   Softcopy shall be in MS Excel or ASCII text as appropriate on electronic media.
 	
   Government comment and acceptance of the submission is required.
								(See Block 16)
								
								15
								Total 1/1

2.3 Data Item Description (DID)

2.3.1 Example DID

The following form provides an example of a DID.

DATA ITEM DESCRIPTION

1. TITLE **Asset Identification Report**	**2. IDENTIFICATION NUMBER** **DI-ATO-W-2003-005**

3. DESCRIPTION/PURPOSE

The Asset Identification Report is an electronic bill of material of all assets applicable to a system and/or subsystem where the assets have been affixed with a barcode label. The label becomes the "License Plate" against which attributes of the asset may be recorded in, or extracted from, the FAA's asset management systems. The license plate provides unique identification of the asset over its serviceable life cycle. This is applicable to each system or equipment component down to the Lowest Replaceable/Repairable Unit (LRU), as well as LRU site spares, test equipment, computer equipment, and other 'accountable' equipment in accordance FAA Order 4600.XX. This report is produced in electronic format.

4. APPROVAL DATE (YYMMDD)	**5. OFFICE OF PRIMARY RESPONSIBILITY (OPR)** ATO-W, Asset Management and NAS Supply Support Group	**6a. DTC APPLICABLE**	**6b. GIDEP APPLICABLE**

7. APPLICATION/INTERRELATIONSHIP

7.1 This data item description applies to all contracts where the agency (FAA) has purchased assets or equipment.

7.2 Each item in this DID may not be appropriate to all contracts. If approved by the Government, tailoring of this DID is permissible to include data items not identified herein, or to omit data items not present in a given contract. Any such tailoring must be supplied for Government review in a proposed modified DID form. Government approval must be obtained prior to any tailoring of this DID.

8. APPROVAL LIMITATION	**9a. APPLICABLE FORMS**	**9b. AMSC NUMBER**

10. PREPARATION INSTRUCTIONS

10.1   Format. Specific content and formal instructions for this document are identified below.

10.1.1   Response to tailoring Instructions. In the event that a paragraph or subparagraph has been expanded, a statement describing the intent and use of the added information shall be added directly following the heading of each such (sub) paragraph. In the event that a paragraph or subparagraph has been tailored out, a statement to that effect shall be added directly following the heading of each such (sub) paragraph. If a paragraph and all of its subparagraphs are tailored out, only the highest-level paragraph heading needs to be included.

10.1.2   Use of alternate presentation styles. Charts, tables, matrices, or other presentation styles are acceptable when the information required by the paragraphs and subparagraphs of this DID can be more readable.

10.1.3   Paragraph numbering. Paragraph numbering shall follow the outline contained in Section 10.2 below.

10.1.4   Contents. Submitted documentation should follow outline and content of Section 10.2 as tailored by the Contract Data Requirements List (CDRL).

10.1.5   Use of Existing Data. Data provided by the contractor for this DID shall be extracted from contract related deliverables to the fullest extent possible.

10.1.6   DID Tailoring. Unless otherwise specified in the contract, all paragraphs of Section 10.2 are required.

10.2   Outline and Content. The submitted shall be in accordance with the following outline and content.

10.2.1   Media. The report shall be submitted in softcopy in MS Excel/industry standard spreadsheet or ASCII text as appropriate on electronic media. The header and footer records occur once.

10.2.2   Contents. The ELECTRONIC FILE shall contain a listing of all assets that have been identified with a unique asset identifier. Lowest Replaceable Units (LRUs) may consist of circuit boards, modules, cables, power supplies, etc. The following data elements shall be recorded as they apply to each asset. This Report shall contain data elements for every item of each type (System, Equipment, Installed Asset and Asset Spares), for which a bar code exists. Use the Comments field to qualify and/or extend the data elements within System, Equipment, Installed Asset and Asset Spares categories.

10.2.3   Required fields. The mandatory fields for data to be imported into the FAA's asset management system are listed below in **BOLD** and Required column "Yes". Fields not listed as required, may be required as determined by the systems / assets Program Office or IPT.

11. DISTRIBUTION STATEMENT

2.3.2 DID Required Fields - Contractors

Contractors are required to include the following fields (as defined in 10.2.3 of the DID preparation instructions) as described below:

Field Name	Type/Length	Required	Description
Asset Barcode	VarChar (30)	Yes	Asset Barcode (See Asset Identification Specification)
Equipment Description	VarChar (30)	Yes	Asset Name, Nomenclature or Description
National Stock Num	VarChar (13)	Yes	Defense Logistics Information Service assigned National Stock Number
Mfg Part Number	VarChar (32)	Yes	Manufacturer assigned Part Number
CAGE Code	VarChar (5)	Yes	Manufacturer's CAGE Code assigned by Defense Logistics Information Service
Serial Number	VarChar (30)	Yes	Manufacturer assigned Serial Number
Manufacturer	VarChar (36)	Yes	Manufacturer Name
Year Manufactured	Numeric (4)	Yes	Year Asset Manufactured
Cost	Dollar (8)	Yes	Acquisition Cost
Unit of Issue	VarChar (25)	No	See Pick List
PR Number	VarChar (14)	No	FAA Purchase Request Number
Contract/PO number	VarChar (17)	Yes	FAA Contract / Purchase Order Number
Comments	VarChar (450)	No	Comment
Parent Barcode	VarChar (30)	Yes	Barcode of the Asset, for which this asset is a sub-assembly. If Parent is N/A the field should contain the Asset Barcode.
Warranty Expiration*	Date(8)	Yes*	MM/DD/YYYY
Photo Identifier*	Digital Photo	Yes*	2 Photos, one of the entire part pointing to the barcode, and one zoomed in photo showing the placement (with specified measurements for location) of the barcode

Table 1: DID required fields for contractors

*Note: Warranty Expiration and Photo Identifier information is required for assets acquired by the FAA Logistics Center (FAALC)

2.3.3 DID Required Fields – FAA

For proper tracking in AITS, the FAA acquiring entity must add the following fields to the information provided by the contractor:

Field Name	Type/Length	Required	Description
Region	VarChar (2)	Yes	See Pick List
Cost Center	VarChar (8)	Yes	FAA Cost Center Code
Location ID	VarChar (4)	Yes	Facility Service Equipment Profile assigned Facility Type
Facility Type	VarChar (5)	Yes	Facility Service Equipment Profile assigned Location Identifier

Location 1	VarChar(30)	Yes	
Location 2	VarChar(30)	Yes	
Location 3	VarChar(30)	Yes	
Test Equipment	Boolean	Yes	
Job Order Number	VarChar (5)	No	Resource Tracking Program assigned Job Order Number
Fund Source	VarChar(1)	No	
Fund Source Comment	VarChar(30)	No	
F & E	Boolean	Yes	
Condition Code	VarChar(1)	No	
System Name	VarChar(25)	No	
Date Received	Date (8)	Yes	
Remarks	Varchar(450)	No	

Table 2: DID required fields for FAA acquiring entities

2.4   Asset Identification Label

See the Asset Identification Specification (in the previous section of this document) for complete label and identification specifications. Documents are available from the AM&NSST website at https://intranet.faa.gov/FAAEmployees/org/linebusiness/ato/operations/technical_operations/amnsst/ .